

Samson's Hair: Denuding the Technology Curriculum?

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The biblical story of Samson (Judges 13–16) tells of a bold, super-strong hero of his people who was compromised when his hair, the source of his supreme strength, was cut off while he slept. What is occurring in the technology curriculum in the United States may indeed parallel the Samson tale. For, in spite of glorious concepts, relevant content, and ambitious standards, its effectiveness may be compromised. It appears that the curriculum's "Samson's hair," activity that includes hand skill development which, for so long, has been the source of its uniqueness and strength, is being diminished. Regrettably, this important element is totally nonexistent in some technology instruction. In the face of this circumstance, I argue that efforts should be undertaken to ensure that the imaginative curriculum change that is underway integrates and includes, wherever possible, true activity that includes hand skill development.

To consciously and conscientiously include hand skill development in technology courses will continue a unique and distinctive approach to activity learning that was evident in industrial arts. That approach contributed powerfully and positively to individual learning and student development. Inclusion of that element in technology courses today will ensure delivery of instruction that benefits students in a way that is not achieved in other school subjects because it will:

- Maintain the interest of students to a greater extent than occurs in most other subject areas.
- Respond to learning styles that the instructional devices commonly used in other subject areas do not do.
- Make a contribution to students' cognitive development in a manner not enjoyed by virtually every other subject area in the schools.

With hand skill development, pursued consciously and effectively, the technology curriculum will reflect unique but important qualities, as did industrial arts. Thus, in response to the industrial age, the content of manual arts and manual training programs appropriately responded to changing societal and human needs. But activity and hand skill

development, practiced in the curriculums being replaced, were maintained.

Now, technology curriculum efforts are responding to the information and computer age in the same way that industrial arts upgraded the manual training and manual arts content to respond to the industrial age. Interestingly, while we have learned more about the efficacy of activity and hand skill development, technology curriculum developers seem to have chosen not to follow the industrial arts approach to changing content while maintaining the efficacious part of the methodology.

A well-founded fear is that although the new standards characterize the new direction as an activity curriculum, the nature and structure of the laboratory settings, learning activities, and equipment in the laboratory settings result in a dearth of learning experience that include true hand skill development.

Thus, we may be witnessing noble and efficacious curriculum content and concepts promulgated and implemented without that element that may be considered the most important and beneficial learning aspect that our field has to offer. If this is true, then it is appropriate to challenge leaders to ensure that the new technology content is organized and delivered so that hand skill development remains prominent.

I assert that the lack or diminution of hand skill development in our schools limits the student's engagement in the active learning process and retards the student's growth and development. Thus, my challenge is that leaders should bravely draw upon, integrate, and ensure that the heritage of the rich, unique, and educationally viable industrial arts learning and instructional method that included hands skill development will be carried forward and be pervasively evident in the new curriculum.

While the preceding outlines today's situation in general, I offer some specifics in the three following parts: First, I relate our heritage as imbedded in the views of an early industrial arts leader. The second part reviews statements regarding that heritage made by contemporary leaders who support activity and hand skill development. The third part is

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devoted to the views of an eminent neurologist who elaborates the importance of hand skill development in his recent best-selling book. Finally, I take the liberty to follow-up and conclude with a summary that reiterates the critical need to include hand skill development activity in the technology curriculum in order for that curriculum to serve the needs of students and continue in American public schools.

Frederick Gordon Bonser's Views

We travel 90 years back in time to trace the recognition of the strength and importance of hand skill development in industrial arts instruction. The historical roots are found at Columbia University with the “father” of industrial arts, Dr. Frederick Gordon Bonser.

Born on June 14, 1875, on a farm in Pana, Illinois (Bawden, 1950), Bonser's early life was filled with doing chores and learning the hand skills necessary for working on a small farm. There were no schools in Pana, and when he reached high school age Bonser moved 160 miles from home to attend high school. After high school he attended the University of Illinois and completed his bachelor's degree in psychology in 1901 and a master's degree in 1902. In 1905 Bonser received a graduate fellowship to Teachers College, Columbia University, where he completed his doctorate in 1906. After teaching in the field for three years, Bonser received an appointment to Teachers College, Columbia University, as head of the newly formed Department of Industrial Education.

In 1912, Bonser and James Russell, dean of Teachers College, published a pamphlet that focused on the introduction of the industrial arts hand skill development curriculum as a way to reform education. This landmark publication emphasized the importance of the hand and the mind as co-equals in education of all children.

Bonser believed that hand work was not just for the development of a skill, but was a means of developing understanding and attitudes (Russell & Bonser, 1912). He also believed that hand skill development was a means of satisfying the constructive impulses of the learner and that all students would benefit from the development of “general dexterity and control appropriate for normal physical growth and general life participation” (Bonser, 1932, p. 158). He emphasized that

“the industrial arts as a study utilize hand work as a means to help in developing meanings and values, as a way of clarifying ideas and cultivating appreciations” (Bonser, 1932, p. 203).

Some years later, Bonser (1932) advocated that the purpose of hand skill development of industrial arts was to “bring more meaning to life. Hands would be used, true enough, but as the willing servants of a better and finer mind and soul” (p. vii). He also supported the importance of his view by the conjecture “as if something good could be done by the hands apart from the mind and soul” (p. viii). With these statements Bonser focused on the integration of hand work into all aspects of education.

It should be added that as an early advocate of the hand and the brain as co-creators of the young person's perception of meaning and value in life, Bonser said:

The use of the industries is basic as a material out of which and up which to build that culture of hand and brain and soul which make the individual alert, inventive intelligent, appreciative, and moral in any vocational activity which either choice or circumstance may impose. (Russell & Bonser, 1912, p. 36)

Bonser (1912) asserted that culture “that is genuine” (p. 36) is founded upon and vitally involved in utilitarian activities. His vision of hand skill training and its role in education was of two parts. The first part emphasized the importance of hand skill training as a means for having a fulfilling life. In this regard his vision supports the unit shop of industrial arts. However, the second part of his vision emphasized the importance of hand skill training as an integral part of every child's education. In this regard his vision more closely supports the underpinnings of today's technology curriculum.

Contemporary Leaders' Views

Technology education must return to and embrace hand skill development as equal to, and integrated with, its own module curriculum if it is going to be of strategic importance in the new century (Foster, 1994; Herschbach, 1997; Petrina & Volk, 1995; Volk, 1996).

In 1994, a paper published in the *Journal of Technology Education* argued that technology education has drawn its philosophical base from industrial arts and it follows that hand skill development should be included (Foster,

1994). Two years later, a second paper in that journal (Volk, 1996) argued for the recognition of “the value of hands-on creative and design process” (p. 35) of the industrial arts curriculum and acknowledged its value as equal to technology education. Petrina and Volk (1995) and Volk (1996) suggested that the problem is that technology education has rejected its historical roots—industrial arts.

Many researchers have reported that the strength of the industrial arts curriculum is its ability to engage the learner in individualized projects that require hand skill development (Jewell, 1995). Volk (1996) suggested that hand skill development is the “hidden curriculum” and the “real strength and true value of industrial arts programs” (p. 34).

In a presentation to the 85th Mississippi Valley Technology Teacher Education Conference, Karnes (1999) reported on a question he posed to leaders in the field: “What are the most critical changes or improvements which must be made if technology education is to be an integral component of strategic importance in the total educational enterprise of the new century?” (p. 11).

He received and reported on responses from 35 distinguished leaders in our profession (Karnes, 1999). Five papers touched on the contribution of the industrial arts curriculum and hand skill development. One recommended that the foundation of the new technology education curriculum is the history of industrial arts (Barnett, 1999). A second recommended that students learn best when “actively engaged in meaningful activity” and that this activity must have a “hands-on orientation” (Custer, 1999, p. 17). A third asserted that we must not forget that “we teach skills as an integral part of technological knowledge” (Lux, 1999, p. 22). A fourth paper argued that hands-on, realistic experiences with tools, materials, and processes are the methodology of the field (Moss, 1999). Buffer (1999) offered strong support for both Bonser’s and Wilson’s attitude toward activity and hand skill development (my detailed discussion on Wilson is in a following section).

Buffer (1999) remonstrated that the leadership of technology education must remember their historical roots and focus on a new mission and new goals that embrace the principles of industrial arts and hand skill development. He asserted, as did Bonser in

1912, that technology studies must be a “viable and integral component of our educational fabric” (p. 15) and relevant to the social, economic, and political well-being of the students. He closed by pointing out the importance of hand skill development and technical knowledge: “Students need to have experiences with real tools, materials, equipment, and processes in laboratory settings that enable them to achieve technical skills and competencies to solve problems confronted in daily life experiences” (p. 16).

As the new technology curriculum continues to grow and expand, as it ought to, we can only hope that those who write and implement the curriculum heed the wisdom of Barnett (1998), Bonser (1932), Buffer (1998), Custer (1998), Foster (1994), Herschbach (1996), Lux (1998), Moss (1998), Pertina (1995), Volk (1996), and many others and include hand skill development as co-equal with mind development.

The curriculum developers and implementers and the teachers may appreciate the preceding statements from historical and contemporary leaders. They will be persuaded further by Frank R. Wilson’s views about hand skill development.

A Neurologist’s Views: The Thoughts of Frank R. Wilson

Interestingly, like Bonser, Wilson is an alumnus of Columbia University. His book, *The Hand: How Its Use Shapes the Brain, Language, and Human Culture*, published in 1998, defines his vision about the importance of the hand in daily life. Wilson identifies recent discoveries and research that provide support for Bonser’s vision including: “It may also be that the most powerful tactic available to any parent or teacher who hopes to awaken the curiosity of a child, and who seeks to join the child who is ready to learn, is simply to head for the hands” (p. 296).

Wilson is a neurologist and the medical director of the Peter F. Ostwald Health Program for Performing Artists at the University of California School of Medicine, San Francisco. In spite of the program’s title, Wilson is a neurologist to all occupations who have problems with their hands. He serves performing artists who have serious hand complications and can no longer play their instruments. He serves teachers with hand damage who want to return to the classroom

and write well. He serves writers who have chronic writer's cramps and also plumbers, carpenters, auto mechanics, and computer programmers who are having trouble with hand control.

The 1998 book reports the results of 15 years of research. Wilson began his research with a plan to identify how the brain controls the hand. Through his extensive research and interviews, he found, to the contrary, that the hand not only controls a large portion of the brain but also actually trains the brain and creates value for it.

Wilson argues that the hand has shaped our development cognitively, emotionally, linguistically, and psychologically. In support of this view, he shares recent compelling research in anthropology, neuroscience, linguistics, and psychology and the results of personal interviews with 27 professionals who depend on the use of their hands for the fulfillment of their life's work.

Anthropological research, according to Wilson (1998), suggests that the brain tripled in size in response to the developmental requirements of the hands, arms, and shoulders. He cites research that demonstrates how the bones of the hand, arm, and shoulder are not connected in a physical joint but are suspended in position by a complex network of muscles, membranes, and ligaments. This complex network instructs the brain on how to follow so that a finger extended can move and land at an exact point that may or may not have been visually identified. The hand can accomplish this, over and over again, with great accuracy and without the conscious awareness of the other one third of the brain.

Wilson (1998) further asserts that the fingertips are the most sensitive part of the body. The fingertips can describe to the brain the unseen nut or bolt as the skilled auto mechanic removes a small part. Upon repair of the removed part, the hand working in concert with the brain brings the part accurately back into a hidden position that can be around a corner, up a bit, and angled to the left. The hand can do all this with the accuracy of the violinist or with skill of the surgeon because two thirds of the brain has "pre-wiring" (p. 125) that serves as a blueprint for the development of hand skills. This pre-wiring remains dormant until the hand skills are developed and becomes active once the hand skills are developed. The information, which

is coming from the hand, is automatically processed in the brain and brings meaning and value to life experiences. Without the awakening of the hand skills and the pre-wiring in the brain, the meaning and value will remain unknown and out of reach.

Wilson (1998) makes the fascinating point that the hand talks to and develops the brain as much as, or even more than, the brain dictates to the hand. He argues, as Bonser did, that to ignore and not to integrate hand skill training of the individual into the school curriculum creates an educational process that is "grossly misleading and sterile" (p. 7). He calls for the understanding, integration, and acceptance of hand development as central to human culture and a "basic imperative of human life" (p. 10). The educational system, he suggests, "should accommodate the fact that the hand is not merely a metaphor or an icon for humanness, but often the real-life focal point—the lever or the launching pad—of a successful and a genuinely fulfilling life" (p. 277).

The premise for Wilson's (1998) book is that the hand is at the core of human life as much as the brain. He also asserts that because of the central role of the hand in bringing meaning, understanding, and value to one's life that hand development is as much about intelligence and intellectual thinking as the brain.

Wilson (1998) has found that many young people are gifted at using their hands—they can build and fix complicated things in everyday life. He points out that often these same students have difficulties in learning when the hand is not involved. He asserts that we must come to understand that there are two kinds of intelligence: the hand as "hand knowledge" represents one and the other is represented by the brain as "symbolic knowledge." He asserts that the two should be integrated and that both are equally powerful in leading the student to a meaningful and successful life. However, he maintains that the intelligence of hand knowledge is not equally appreciated when it comes to the praise and reward systems of our schools. Wilson recommends that educators should find ways to explore and to integrate into their curriculum the "interaction of intelligence-as-information [book and language based knowledge] and intelligence as action [hand-skill knowledge]" (p. 284).

Destroy the Temple?

Readers will recall that in the Bible story Samson regains some strength from a slight regrowth of hair. In spite of the fact that his enemies had blinded him, he induces someone to lead him to the central pillars of his enemies' temple. His last act in life is to find the strength and energy to move those supports and the temple is destroyed. We could take the analogy a bit farther and urge the field to build upon the small amount of true activity and hand skill development that exists in some technology courses. When it succeeds to completely reintroduce hand skill development, the technology curriculum will enjoy a strength and attractiveness that will result in its wider adoption and that will endure. Or, we could learn from Samson's blindness. It did not stop him from achieving the objective of destroying his enemies. But, in the case of the technology curriculum, blindness to the importance of activity that includes hand skill development may be akin to pulling the temple down upon the field.

Could some future historian of education point out that leaders of a most vital curriculum denuded that curriculum of its salient contribution of hand skill development integrated with activity? Could the historian write that in response to the changing needs of the population and society those leaders created intriguing and highly popular curriculum materials and conceptualized their delivery in laboratories that were appealing and *a la mode*? Could that future observer go on to say that while they spoke of "activity," it was not the historical and tried and true hand skill development activity of industrial arts? And is it possible that the writer would conclude that with the uniqueness lost, the teachable moments in the curriculum they developed could then be done by others such as science, mathematics, or social studies teachers.

I hope that that scenario will never occur and that we will endeavor not to "cut the Samson's hair" from our curriculum but ensure that all our curriculum efforts and all our modules and all our new laboratories will provide, in as many cases as possible within the curriculum, the "Samson's hair" of our field—activity that includes hand skill development with tools and materials. In this regard and as a segue to my close, I share a message from one teacher to another. After all, I quoted a number of leaders, all of whom did

or are operating at the university level.

Now let me draw from a true leader who is doing the curriculum. He is in a position to really know. Following is a message to a fellow teacher from Joe Leogrande (personal communication, March 27, 2002), a highly successful middle and high school teacher and the newly elected president of the New York State Technology Education Association:

[Yes...] RJT, Lab Volt, Hearlihy, Paxton-Patterson modular technology labs and others like them are very well-developed curriculum [materials] provided the students can read manuals, and assemble prescribed projects. As you mentioned, authentic assessment activities where students design, draw, construct, test, optimize, test, and present, are the most valuable. A blending of lab and authentic assessment activities are the best solution, and Sayville Middle School, which was program of the year in 2001 does just that. They have a computer lab and a "shop" to combine their activities. Yes, students who just sit at computers and build or just simulate real stuff will not do as well on the assessment since all the standards of tools and resources are not being covered, and no saw dust will ever be in the cuffs of kids.

My friend from Sodus Middle School just installed a computer-based tech lab, and he feels sorry that his students will never touch a band saw or sander in middle school, they will just see and hear a simulated version of them on a computer.

There is a danger to be avoided. We ought to ensure that students are not considered to have completed a course in technology that is devoid of real and meaningful hand skill development opportunities. Those of us who plan experiences that may include work with modules, kits, and computers ought not accept the hand work associated with those elements as equivalent to the true hand skill development experiences that would have been acceptable to Bonser in his lifetime and accepted by leaders in the field today and to Wilson. The changed nature of the content is not an excuse to cast hand skill development out. Rather, if the new content is to be offered and be meaningful, the challenge to the developer is to discover, create, and implement learning experiences with the new content that provide hand skill development opportunities. For, if anything can be learned from the tour that I have taken with you, dear reader, is that the content of the field is fleeting and is likely to remain so. But the real contributions to student growth have come from the field's unique instructional methods, its activity base

and hand skill development. That fact, along with the realization that those are the enduring aspects, should guide curriculum and instructional development efforts. We owe no less to our clients.

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